



The Determinants of Sudan's Trade Balance: An Empirical Investigation, 1970-2014

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Abstract

This paper employs the autoregressive distributed lag (ARDL) approach to co-integration and the associated error correction model (ECM), to examine the factors that determine the Sudan's trade balance in the long and the short-run over the period 1970-2014. Such factors are exchange rate, cost of finance, credit to the private sector, real per capita GDP, inflation rate and domestic investment. In the long run exchange rate, inflation and real per capita GDP exert negative effects, while cost of finance, credit to the private sector and investment have positive effect on trade balance. All coefficients have the expected sign and statistically significant except the coefficient of the exchange rate which has the wrong sign. This is because devaluation/depreciation of domestic currency increases the cost of local as well as imported production inputs which leads to an increase in total imports and then deteriorates the balance of trade. Also, the rigidities that characterize the Sudanese economy is one of the factors that leads to this inverse relationship between exchange rate and trade balance. Although we could not find any short-run relationship between the explanatory variables and trade balance in Sudan, these variables are found to be related in the long-run. The results indicate that there is weak relationship between investment and trade balance which is attributed usually to the prevailing situations of political instability, prolonged civil wars, and other factors such as uncertainty over agricultural leases which resulted in declining investment, particularly in major agricultural projects.

Keywords: Trade balance", ARDL Model", Exchange rate", Inflation rate", Per capita income", Investment", Cost of finance: Sudan.

1. Introduction:

Like many Sub-Saharan African countries Sudan's trade balance over many years has been experiencing trade deficits. One of the main reason for such performance is the poor economic strategies that have been adopted by the different governments in their economic reforms and the dependency on certain specific primary products for the exports and import a lot of the manufactured goods.

The Sudan's economy has witnessed major transformations during the last four decades. Full government control over economic activities characterized the period of the 1960s, while an inward-looking strategy dominated development policy during the early 1970s and mid-1980s. Economic difficulties assumed crisis proportions during the second half of the 1970s, following the ambitious development program launched at early 1970s. The failure of the investment boom to increase the economy's productive capacity has accelerated the crisis. By the late 1970s, the government was confronted by falling export earnings, increasing import bill, accelerating budget deficit, and mounting foreign debt. In the face of continuous economic deterioration, economic reforms became inevitable. The worsening balance of payments and deepening foreign debt problem made the foreign sector the



central policy target over the period 1978-1985. Thus, the government launched three short-term development programs, starting June 1978, with financial assistance from the IMF. These programs aimed at improving the current account, attracting foreign capital and foreign investment, increasing capacity utilization, reducing the rate of inflation, and promoting economic growth. However, until 1985, the outcome of these policy packages was stagnation in exports, increase in imports, deterioration in the trade balance and the balance of payments, accumulation of foreign debt, soaring inflation rates, loss of the national currency of its purchasing power, and increasing poverty (Mahran, 2007). One of the important IMF policy package is the devaluation of the currency to improve trade balance.

Several studies have been undertaken to examine the effect of devaluation of the Sudanese pound on the economy and the trade balance. For example, Hussain and Thirwall (1984) examined the profitability of long and medium staple cotton, groundnuts, sesame and gum Arabic as main Sudan's export. Their results revealed that the elasticity of export supply may be very low because of structural rigidities and factor immobility, while the elasticity of import prices and domestic prices may be very high, so that profitability of exporting remains largely unchanged. Thirwall (1992) added that, when the price elasticity of demand for exports is large but not infinite and real wages are sticky downwards, devaluation might be a second-best policy compared to structural intervention to raise foreign exchange earnings per unit of domestic inputs.

Given the small number of recent studies that test the determinants of trade balance in Sudan the major objective of this study is to partially fill this knowledge gap. And due to prolonged trade imbalance in Sudan then it is important to re-examining some factors that could be the main cause of this trade deficit. More specifically, this paper investigates empirically the long-run relationship and short-run dynamic linkages between trade balance and its determinants in Sudan during the period 1970- 2014. The study employs the autoregressive distributed lag (ARDL) approach to co-integration and error correction models. We included six determinants of trade balance in our analysis which are exchange rate, cost of finance, credit to the private sector, real per capita GDP, inflation rate and domestic investment. In the long run exchange rate, inflation and real per capita GDP exert negative effects, while cost of finance, credit to the private sector and investment have positive effect on trade balance. All coefficients have the expected sign and statistically significant except the coefficient of the exchange rate which has the wrong sign. Also, we could not find any short-run relationship between the explanatory variables and trade balance in Sudan.

The reminder of the paper is organized as follows: Section (2) discusses briefly the relevant literature. Section (3) provides some background about the Sudanese economy and its external sector. Section (4) discusses the research methodology, including model specification and methods of analysis. The main results of the paper are contained in section (5). Finally, section (6) concludes the study

2. Literature Review:

There are many empirical studies that examined the determinants of trade balance especially the effect of exchange rate depreciation on a country's trade balance which extensively examined in the empirical literature in the context of the Marshall Lerner condition and the J-curve theory. According to the former, currency devaluation improves the trade balance only if the sum of the absolute values of import and export demand price elasticities exceeds unity. However, due to lag dynamics, the structure can worsen in the short run because of the inelastic demand for imports and exports in the immediate aftermath of an exchange rate change (Bahmani-Oskooee and Niroomand (1998)). In contrast, Gomes and Paz (2005) and Tsen (2006) find the existence of a long-run relationship between the trade balance, real exchange rate, foreign and domestic income for Brazil and Malaysia during 1965-2002. Bahamani-Oskooee and Ratha (2004) provide a good survey on the Marshall Lerner condition and J-curve, showing inconclusive results for this issue.



Magee, S.P. (1973) was the first to notice that the U.S. trade balance deteriorated despite devaluation of the dollar in 1971. He then theoretically argued that it is possible for the trade balance to deteriorate after currency depreciation, mostly due to lags in the response of trade flows to a change in exchange rate but once the lags are realized then eventually the trade balance improves.

Rose (1991) has examined the empirical relationship between the real effective exchange rate and trade balance for five major OECD countries. He found that the exchange rate is a statistically insignificant determinant of the balance of trade. Similarly, Rose and Yellen (1989) do not find any significant relationship between the real exchange rate and balance of payments. Most studies relating the exchange rate to the trade balance have found weak statistical evidence of such a relationship, i.e., Greenwood (1984), Mahdavi and Sohrabian (1993), Rahman and Mustafa (1996), and Rahman et al. (1997).

Imam Sugema (2005) investigated the determinants of trade balance and adjustment to the crisis in Indonesia. His results suggested that trade balance will improve due to the devaluation through an increase in exports and a collapse in imports. Since the elasticity of import with respect to real exchange rate was higher than that of export then according to him that phenomenon implied that trade balance improvement would come from the import compression.

Har wai-mum, Ng yuen-ling, Tan Geoi-Mei (2008) investigated real exchange rate and trade balance relationship in Malaysia for a period between 1955 to 2006, their empirical study showed that there is an existence of long run relationship between trade balance and exchange rate, other major variables that were significant includes the domestic income and foreign income. Their results also indicated the no j-curve effect in Malaysia.

Also, there are many papers that have tested the monetary and absorption approaches to balance of payments. Lardy (1996), Zhang, et al. (1999), and Liu, et al. (2001) have shown that foreign-invested firms have contributed significantly to China's impressive export expansion and economic growth.

Festus O. Egwaikhide (2002) in his study of the effects of budget deficit on trade balance in Nigeria found some evidence from policy simulations and shows that budget deficit arising from increased government spending adversely affects the trade balance irrespective of whether it is money-financed or by external borrowing.

A study on ASEAN-5 countries by Liew et al. (2003) has shown that the trade balance in these countries is affected by real money rather than by the nominal exchange rate.

Peter W. and Sarah T. (2006) did studies on the trade balance effects of U.S. foreign direct investment in Mexico. His analysis showed that the rise of intra firm exports and imports following U.S.FDI in Mexico suggests that FDI affects trade flows.

Also, Duasa (2007) examined the short- and long-run relationships between trade balance, real exchange rates, income, and money supply in the case of Malaysia. He found That money supply and domestic income have a strong negative and positive impact on the trade balance, consistent with the monetary approach and absorption approach, respectively. The findings also suggest that the Marshall Lerner condition does not hold in the long run for Malaysia and that, policy wise, the Malaysian trade balance/balance of payments should be viewed from the absorption and monetary approaches.

Waliullah et al. (2010), using ARDL Co integration approach, found that there is a stable long-run relationship between the trade balance and income, money supply, and exchange rate variables in Pakistan during 1970-2005. The estimated results show that exchange rate depreciation is positively related to the trade balance in the long and short run, consistent with the Marshall Lerner condition. The results provided strong evidence that money supply and income play a strong role in determining



the behavior of the trade balance. The exchange rate regime can help improve the trade balance but will have a weaker influence than growth and monetary policy.

Korap, Levant (2011) analyzed the determinants of the Turkish trade balance using the ARDL bounds testing, his estimation results indicated that real exchange rate depreciations improve the trade balance with a strong and significant value while domestic real income affects the trade balance negatively and that trade balance is strongly improved due to an increase in foreign real income. No significant effect of crude oil prices can be observed on trade balance.

M. zakir saadullar k., M. ismail h. (2012) analyzed a dynamic panel data analysis on the determinants of trade balance of Bangladesh for about 26 years with variables like real GDP, relative GNI, real exchange rate and import weighted index and discovered that import weighted index is significant in both short run and long run while other remaining variables were significant only in short run.

Ray (2012) found that in the long run as well as short run foreign direct investment and foreign income have significant positive impact on balance of trade whereas domestic consumption and real effective exchange rate impacted negatively on balance of trade in India over the period, 1972-73 to 2010-11.

Shawa and Yao Shen (2013) found out that the main influencing factors on trade balance for the case of Tanzania are Foreign Direct Investment(FDI) Human Capital Development (HCD) Household Consumption Expenditure(HCEXP), Government Expenditure (GEXP) Inflation (INF) Natural Resources Availability (NRA), Foreign Income(WY) and Trade Liberalization(TLB).

Kennedy (2013) using co integration and error correction mechanism, revealed that foreign direct investment and exchange rates are the main determinants of balance of payments in Kenya between 1963 and 2012. His findings showed that balance of payments is both a monetary and real phenomenon.

3. The Economy and the External Sector in Sudan:

3.1 Economic Growth in Sudan:

Sudan was the largest country in Africa and the Arab world until 2011, when South Sudan separated into an independent country, following an independence referendum. Sudan is now the third largest country in Africa (after Algeria and the Democratic Republic of the Congo) and also the third largest country in the Arab world (after Algeria and Saudi Arabia).

While historically agriculture remains the main source of income and employment hiring of over 80 percent of Sudanese, and makes up a third of the economic sector, oil production drove most of Sudan's post-2000 growth.

Over the years, Sudan's growth rates have shown fluctuating trends reflecting the effect of fluctuating weather conditions on agricultural production. The performance of the country in many ways typifies the severe economic decline that has affected many countries in the region since 1970s. In the late 1990s, oil and natural gas has also emerged as major sources of economic growth and revenue for the government as reflected in the balance of payments and investment flows.

Since independence in 1956, the economy has registered positive growth during two periods, namely the 1971-1983 and the 1990s onward periods.

Since 1989 when the present government has taken office, the economy has witnessed dramatic changes following the adoption of economic and institutional reforms as well as privatization and liberalization policies. The reforms started with the three-year economic salvation program (1990-1993) which focused on addressing economic stagnation where the agricultural sector was given priority. Despite the enormous resources, the performance of the agricultural sector was below its



potential. An expansionary monetary policy was adopted while banks were instructed to direct 50 percent of their finance to the sector (Bank of Sudan, 1990).

A second wave of reforms started in 1992 when the National Economic Salvation Program was initiated under the National Comprehensive Strategy (1992-2002). This period witnessed the adoption of liberalization and privatization policies

However, the inflationary pressure has increased tremendously, registering its first three-digit rate of 122.5 in 1991 while reaching a highest rate of 130.4 percent in 1996 with an average annual inflation rate of 104 percent during 1990-1997. Efforts were made to suppress inflation. Thus, macroeconomic and price stabilization has become the focus of a strengthened reform program during 1997-2001. This program was boosted by the production and export of oil in 1998, which constituted a major source of economic growth and revenue for the government (Saber, 2010). For this reason, inflation rate was declined to reach 4.9 percent in 2001 but again inflation crept upwards to double digits of 14.9 percent and 13.4 percent in 2008 and 2009, respectively, due to global economic crises and increases in domestic and world food prices. Due to the secession of Southern Sudan, inflation rate increased more from 18.1 percent in 2011 to reach 37.1 percent in 2013 and 36.9 percent in 2014.

In summary, it may be argued that the period 1992-2008 witnessed strong performance of the economy with considerable improvement in the most important economic fundamentals. The strong economic performance may be attributed to several factors, including the efforts made toward economic reforms, the favorable weather conditions for agriculture, the high investment in the oil sector, the resulting relaxation of the tight foreign exchange resource constraint and the increase in FDI. Real GDP growth surged from about 5 percent in the 1990s to 7.5 percent in 2000–2008, one of the strongest in the region. The macroeconomic stability achieved during this period underpinned the sustained high level of growth achieved. With the independence of the South Sudan in 2011 the growth rate declined to reach 1.1 percent in 2012 and about 3 percent in 2014 (Bank of Sudan).

3.2 The External Sector in Sudan:

The trade balance had suffered progressively large gaps, because of increase of imports at higher rates than exports. The gap rose from US\$ 188.5 million during 1982-1985, to US\$ 417.4 million during 1986-1989 (see table (1)). The average growth rate of exports during the 1980s was 1.8 percent as compared to 7 percent for imports. Export earnings, fluctuated due to their dependence on primary goods of unstable international demand and low prices. The scant response of exports from that period had protracted devaluation from achieving one of its most important objectives of boosting exports. It is also observed that the rate of increase in export proceeds were not proportionate to the progressive increases in export volume insinuating a worsened term of trade. The slowdown of foreign aid associated with political conditionality during the second half of the 1980s had exacerbated the problem of external balance. Instead, financing became closer to trade than development. Likewise, the problem of foreign debt and debt payment obligations have resurfaced and constitute a heavy burden to the balance of payments as well as the national budget. Since the mid-1990s merchandised imports have risen faster than export. The composition of exports changed as agriculture production has improved. Food imports fell from 18 percent of total imports to 14% during 1994 - 1998, while the import of manufactured goods rose from 29% to 41%. However, due to severe shortages, import of foodstuff products rose again to a level of nearly 20% of total imports, while petroleum represented about 13%. For 2001 the ratios are estimated to be 23% for foodstuffs, but less than 2% for import of petroleum, while imports of manufactured goods would represent about more than 75% of total imports.

Export volumes grew in line with overall GDP during the 1990's. Non-oil export volume grew at an average rate of about 11% during 1990-2000, though not for all commodities. Cotton and Gum Arabic, for example, declined. Over the years, there has been a change in the composition of non-oil exports. Traditionally, cotton was most important, but in 1996 it was overtaken by sesame, which remains the leading non-oil export.

**Table 1. Sudan's Trade Balance, 1982-2014 (In Millions US Dollar)**

Year	Exports	Imports	Trade Balance
1982-1985	531	1138.6	-188.5
1986-1989	478.4	912	-417.4
1990	374	618.5	-244.5
1991	305	890.3	-585.3
1992	319.3	820.9	-501.6
1993	417.3	944.9	-527.6
1994	524	1161.5	-637.5
1995	555.7	1184.5	-628.8
1996	620.3	1504.4	-884.1
1997	594.2	1579.7	-985.5
1998	595.7	1924.6	-1329
1999	780.1	1414.9	-634.8
2000	1808	1553	255
2001	1698	1585	113
2002	1949.1	2152.8	-203.7
2003	2542.1	2881.9	- 339.7
2004	3777.8	4075.2	- 297.5
2005	4824.3	7656.8	- 1932.5
2006	4350.6	5969.5	- 1397.7
2007	8879.3	8775.5	1032
2008	11670.5	9351.5	2319
2009	8257.1	9690.9	-1433.8
2010	11404.3	10044.8	1359.5
2011	9688.8	9231.0	4579
2012	4,066.5	8,122.7	-4,056.2
2013	7,086.2	8,727.9	-1,641.7
2014	4,350.2	8,105.9	-3,755.7

Source: Bank of Sudan Annual Reports (various issues) and Ministry of Finance and National Economy (1995-2007).

Sudan has witnessed increased foreign trade activity in recent years, because of the rising aggregate domestic demand and vibrant economic activity over time, as well as the recent rise in worldwide oil prices. Exports grew by 29.8% to US\$ 4.8 billion in 2005, boosted by oil exports, while imports progressed by a slightly higher 30.9% to US\$ 5.9 billion. Subsequently, a trade deficit was recorded in 2005, standing at US\$ 1.9 billion, breaking from a trend of more modest deficits or very small surpluses over the previous five years to 2005 (see table (1)). Also in 2006 a sizable trade deficit of US\$ 1.4 billion was recorded, which was 30% larger than its level in 2005. But in 2007 a trade surplus of US\$ one billion was recorded. The significant widening of the deficit in 2005 and 2006 could be attributed to several reasons resulting from economic policies or sector-related structural obstacles. The important appreciation of the local currency and increased trade openness, part of the market liberalization reforms currently under implementation, have cheapened imports and made exports more expensive. Trade policy measures were mainly revolving around the elimination of all restrictions like commodities' export monopolies and tariff cuts.

In addition, Sudanese export competitiveness has been suffering from other non-economic policy weaknesses, such as supply bottlenecks due to the old and rundown transport network. The civil conflicts that hit mainly areas, where most agrarian production takes place, also damaged major cash crops.

The negative effect of the above-mentioned factors on the trade balance was, nevertheless, toned down, with oil exports making up the bulk of Sudan's exports. Oil exports grew at an average annual rate of



32% during the period 2001-2007, because of both increased production and higher international oil prices.

In contrast, imports (composed mainly of manufactured goods, machinery and equipment, means of transport, and chemicals) have increased at an average annual rate of 31 percent between 2001 and 2007. Although such industrial imports are expected to be of benefit for the development and industrialization of a resource-rich country like Sudan, they also place a burden on short-term economic performance and the trade balance.

The trade deficit constituted a burden to the current account deficit throughout the 2001-2006 periods. In an attempt to bolster its trade potential and create opportunities with other nations, Sudan has recently entered into a number of regional agreements. For instance, it joined the Common Market for Eastern and Southern African (COMESA). Sudan is also working on the process to join the World Trade Organization (WTO).

Sudan has attracted substantial amounts of foreign direct investment (FDI) after the signing of the Comprehensive Peace Agreement (CPA) in 2005, much of which originating from Asia and the Gulf. Much of this has been directed to the oil sector and to economic activities benefiting the central region of the country. According to the Ministry of Investment, for the period 2000-2010, recorded investment in the services sector was predominant, accounting for 57.8 percent, with industry at 38.6 percent and agriculture a disappointing 3.8 percent. The sources of investment were local investors (57 percent), joint ventures of local and foreign investors (18.4 percent) and foreign direct investment (24.6 percent). Eighty percent of the investment in the service sector was by local investors and joint ventures. Investment generally picked after the CPA but seemed to have lost momentum in 2009 and 2010 perhaps due to the uncertainties on the status of South Sudan in the Federation (IMF, 2013). The flow of FDI led to capital account surplus, more than offsetting the current account deficits. As such, Sudan has been registering positive balance of payments, with the latter's surplus registering an average annual growth rate of 13% over the 2001-2005 period to account for around 3% of GDP in 2005 (Bank of Sudan).

The current account deteriorated in 2006 as import demand far outstripped exports, including lower-than-expected oil exports. The current account deficit is approaching 13 percent of GDP in 2006. Major imports include machinery and equipment which are part of an ongoing investment boom. Foreign direct investment inflows more than covered the current account deficit, helping foreign reserves grow to roughly 3 months of imports by end 2006.

The Sudanese economy witnessed the biggest recession at the global level to reach 9% because of the country losing three-quarters of its oil reserves due to the secession of the South. The foreign trade of Sudan declined by 50%, which was the inevitable consequence of the independence of the South. Accordingly, a sizable trade deficit of US\$ 4,056.2 million was recorded in 2012.

The trade deficit reduced from US\$ 4,056.2 million in 2012 to US\$ 1,641.7 million in 2013 due to an increase in export value from US\$ 4,006.5 million in 2012 to US\$ 7,086.2 million in 2013. In contrast, export declined by 9.2%, from US\$ 4789.7 million in 2013 to US\$ 4350.2 million in 2014 due to the reduction in oil export by 26.9%. Also, imports declined from US\$ 8727.9 million in 2013 to US\$ 8,105.9 million in 2014. Accordingly, trade deficit increased from US\$ 1641.7 million in 2013 to US\$ 3755.7 million in 2014. (see table (1)).

Continuous trade deficit in Sudan leads Sudan to severe debt problem. Sudan's debt problems can be traced back to the 1960s when the country embarked on large-scale industrialization, financed in part by foreign borrowing on non-concessional terms, and accompanied by government heavy regulation of the economy. The resulting heavy debt burden has shaped the evolution of the country's economy and its performance over the past 20 years. The arrears to International Development Association (IDA), the African Development Bank (ADB) and other development agencies have prevented normal relations with these agencies and constrained access to concessional financing. Sudan's external debt, which amounted to US\$37 billion at end- 2010, of which US\$31 billion is in arrears, is unsustainable. (IMF, 2013).



Due to the problems that faced the economy and the external sector in Sudan since the mid-1970, many strategies and reforms are undertaken. Trade policies during the period 1960-1977 aimed at diversifying the economy by developing new lines of production in industry and introducing new cash crops (e.g. oil seeds like groundnuts and sesame) other than cotton, which was the major source of foreign exchange earnings (contributing 46-62 per cent to Sudan's total export revenues). Although exports did not require a license (except for essential products) they were subject to an export duty. Imports competing with local produce were prohibited. Imports of most non-essential commodities were limited by a tight credit policy and ceilings imposed on import licenses. The foreign sector became the central policy target over the period 1978-1985 when the government launched a stabilization program with financial assistance from the IMF. The program involved a more liberal foreign trade and exchange regime. In 1987 the government launched a four-year Salvation, Recovery and Development Programme (1988/89-1991/92) to address the major inherited economic problems. In many respects, it revived the standard IMF stabilization measures aiming to create a more conducive environment for the private sector.

Since February 1992 the state launched a reform and free market policy, as laid out in the National Economic Programs for 1990-1993 and 1992-2002. The programs aimed at encouraging economic and commercial activities by freeing prices and removing administrative restrictions on import and export. The reform program included the following: removing and lowering taxes on exports, orienting finance (credit) policy to support the export sector, simplifying export and import procedures and abolishing licenses on exports and imports, opening of new market, Development of the export sector in industrial goods, paying more attention to quality control, and customs reform policy and abolishing export duties on various items.

The main objective of Sudan 2001-2010 Program is to improve export performance by increasing oil production and exports and exploration of other mineral resources, increasing exports of animal resources, agriculture and wildlife products, increasing meat and fisheries export.

In spite of all these reforms the non-petroleum exports showed a systematic decrease in its share of export and this is due to the high production costs and deterioration in productivity and quality, which reduces competitiveness of these goods, high cost of financing, poor export services, particularly transport, storage and port handling, limited resources earmarked for marketing and advertising, lack of information on external markets among businessmen and exporters, and a low level of experience and general knowledge, a lack of stability and peace as a result of war and conflicts, leading to decreasing levels of investment in addition to the fact that most of Sudanese export goods are primary products and raw materials and then their international prices are generally low.

4. Research Methodology:

4.1 The Theoretical model:

Balance of Trade (BOT) is usually measured as the difference between the values of total exports and total imports. In This study, we measure trade balance as the ratio of the exports value to the imports value. This ratio or its inverse has been widely used in many empirical investigations of trade balance determinants, such as Bahmani-Oskooee and Brooks (1999), Lal and Lowinger (2001), and Onafowora (2003). The ratio of the exports value to the imports value is preferable because it is not sensitive to the unit of measurement and can be interpreted as the nominal or real trade balance (Bahmani-Oskooee, 1991).

In this study the explanatory variables that expected to have an impact on Sudan's balance of trade are exchange rate, cost of finance, credit to the private sector, real per capita GDP, inflation rate and domestic investment. Exchange rate which is defined as the domestic price of foreign currency impacts positively on the trade balance. Theoretically, and according to the elasticity approach a nominal devaluation of currency improves trade balance (Bickerdike, 1920; Robinson,1947; Metzler, 1948). The rise of domestic price of foreign currency (Devaluation/depreciation) leads to a reduction in



import, because it becomes more expensive, and an increase in export because it becomes cheaper in foreign markets.

An increase in the cost of finance (which is the interest rate from 1970-1982, and profit margin from 1983-2014) will reduce the money supply in the country, then the excess demand for money will be satisfied by inflows of money from abroad. In this case, the trade balance will improve. On the other hand, a reduction in the cost of finance i.e if the central bank is supplying more money than is demanded, will worsen the trade balance. This view is called the monetary view of the balance of payments which is emerged at the end of 1950s. Per this view the balance of payments is essentially a monetary phenomenon (Polak, 1957; Hahn, 1959; Prais, 1961; Mundel, 1971).

Credit to the private sector is the credit extended to the private sector by commercial banks. It indicates the importance of the role played by the financial sector, especially the deposit money banks, in the financing of the export sector and the rest of the economy which in turn improve the trade balance. It isolates credit issued to the privates' sector from credit issued to governments, government agencies, and public enterprises. Also, it excludes credits issued by the Central Bank (Levine, et al 2000). The underlying assumption is that credit provided to the private sector generates increases in investment and productivity to a much larger extent than do credits to the public sector. It is also argued that loans to the private sector are given under more stringent conditions and that the improved quality of investment emanating from financial intermediaries. Evaluation of project viability is more significant for private sector credits.

Real per capita GDP is a key determinant of import demand since it represents the absorption capacity of the importing country. An increase in real per capita GDP can affect trade balance negatively or positively. If an increase in per capita income increases demand for imported goods more than an increase in the demand for domestic goods, the balance of trade will have worsened and the opposite is true. In this study, we expect negative relationship between real per capita GDP and trade balance.

Inflation is measured in the analysis as the percentage change in Consumer Price Index (CPI) at 1990 base year. High inflation distorts economic activity and reduces investment in productive enterprises, thus reducing economic growth. They add inefficiencies in the market, and make it difficult for companies to budget or plan long-term. Inflation can act as a drag on productivity as companies are forced to shift resources away from products and services to focus on profit and losses from currency inflation. Uncertainty about the future purchasing power of money discourages investment and saving. Higher inflation in one economy than another will cause the first economy's exports to become more expensive and affect the trade balance negatively.

The share of investment in GDP is one of the few economic variables that have robust effect on export and the overall economy. Then we expect positive relation between investment and balance of trade.

We estimate the model of the determinants of balance of trade in Sudan. After taking the natural logarithm of the variables, the estimable model is:

$$LBOT_t = \alpha_0 + \alpha_1 LCOST_t + \alpha_2 LCPS_t + \alpha_3 LEXCH_t + \alpha_4 LINF_t + \alpha_5 LINV_t + \alpha_6 LPER_t + U_{1t} \quad (1)$$

Where LBOT represent the natural logarithm of balance of trade. LCOST is the log of cost of finance; LCPS is the log of the ratio of the credit to the private sector to GDP; LEXCH is the log of exchange rate; LINF is the log of inflation rate; LINV is the log of current investment/GDP ratio; LPER is the log of per capita GDP, and U is a white noise error term. The equations in (1) represents only the long-run



equilibrium relationship and may form a cointegration set if all variables included in the equation are integrated of order one, i.e. I(1).

4.2 Analytical Methods:

To examine the determinants of trade balance in Sudan, we collect annual time series data from various issues of the Bank of Sudan Annual Reports for the period 1970-2014. In this study, we examine the empirical long-run relationships and dynamic interactions among the variables, using the autoregressive distributed lag (ARDL) bounds testing approach to cointegration, as developed by Pesaran and Smith (1995) and Pesaran *et al.* (2001). An ARDL model is a general dynamic specification, which uses the lags of the dependent variable and the lagged and contemporaneous values of the independent variables, through which the short-run effects can be directly estimated, and the long-run equilibrium relationship can be indirectly estimated. Pesaran and Shin (1999) introduce the bounds test for cointegration that can be employed within an ARDL specification. This method has definite advantages in comparison to other cointegration procedures since it can be employed regardless of whether the underlying variables are I(0), I(1) or fractionally integrated. Thus, the bounds test eliminates the uncertainty associated with pre-testing the order of integration. Secondly, it can be used in small sample sizes, whereas the Engle–Granger and the Johansen procedures are not reliable for relatively small samples (Narayan, 2004). Given that our sample size is limited with a total of 45 observations only, conducting bounds test will be appropriate.

To estimate the relationship between the above explanatory variables and trade balance in Sudan, the first task is to test for the presence of unit root. This is necessary to ensure that the parameters are estimated using stationary time series data. Thus, this study seeks to avert the occurrence of spurious results. To do this, the Augmented Dickey-Fuller (ADF) test is used. The null hypothesis is that the variable in question has a unit root (i.e. it is non-stationary), which is tested against the alternative hypothesis that the variable has no unit root (i.e. it is stationary). To reject the null hypothesis, the ADF statistics must be more negative than the critical values and significant. Along the lines of Pesaran *et al.* (2001) if all variables involved are stationary, the next step is to apply the bounds testing approach to examine cointegration between the variables.

The ARDL approach involves two steps for estimating the long-run relationship. The first step is to examine the existence of a long-run relationship among all variables in the equation under examination. Conditional upon cointegration is confirmed, in the second stage, the long-run coefficients and the short-run coefficients are estimated using the associated ARDL and ECMs. To test for cointegration in Equation (1) by the bounds test, the following conditional Unrestricted Error Correction Model (ECM), is constructed assuming maximum lag lengths of q and k for the dependent and explanatory variables, respectively:

$$\Delta \text{LBOT}_t = \alpha + \lambda_1 \text{LBOT}_{t-1} + \lambda_2 \text{LCOST}_{t-1} + \lambda_3 \text{LCPS}_{t-1} + \lambda_4 \text{LEXCH}_{t-1} + \lambda_5 \text{LINF}_{t-1} + \lambda_6 \text{LINV}_{t-1} + \lambda_7 \text{LPER}_{t-1} + \sum_{i=1}^q \phi_i \Delta \text{LBOT}_{t-i} + \sum_{i=1}^k \epsilon_i \Delta \text{LCOST}_{t-i} + \sum_{i=1}^k \varphi_i \Delta \text{LCPS}_{t-i} + \sum_{i=1}^k \xi_i \Delta \text{LEXCH}_{t-i} + \sum_{i=1}^k \gamma_i \Delta \text{LINF}_{t-i} + \sum_{i=1}^k \delta_i \Delta \text{LINV}_{t-i} + \sum_{i=1}^k \rho_i \text{LPER}_{t-i} + U_{it} \quad (2)$$

Where the parameters $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5, \lambda_6$ and λ_7 are the long-run parameters (elasticities), while $\phi_i, \epsilon_i, \varphi_i, \xi_i, \gamma_i, \delta_i$ and ρ_i are the short-run dynamic coefficients of the underlying ARDL model, and U_{it} are white noise errors. To examine the existence of a long-run relationship between the system variables, the OLS method was applied to the (unrestricted) ECMs given in Equation (2). Since the coefficients λ 's of the lagged variables represent the long-run parameters of the underlying ARDL model, the existence of a long-run relationship among the variables is examined by conducting an F-test for the joint significance of these coefficients. Thus, for Equation (2), the null hypothesis of “non-existence of the long-run relationship” defined by:

$$H_0: \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = \lambda_7 = 0$$



and it is tested against the alternative hypothesis

$$H_1: \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq \lambda_7 \neq 0$$

These hypotheses are examined using the standard Wald or F-statistics. The F-test statistic has distribution which depends upon (i) whether variables included in the ARDL model are I(0) or I(1), (ii) the number of regressors, (iii) whether the ARDL model contains an intercept and/or a trend, and (iv) the sample size. The F-test has a nonstandard distribution. Thus, Pesaran and Pesaran (1997) and Pesaran et al (2001) have provided two sets of critical values for the cointegration test. The lower critical bound assumes that all the variables are I(0), meaning that there is no cointegration among the variables, while the upper bound assumes that all the variables are I(1). If the computed F-statistic is greater than the upper critical bound, then the null hypothesis will be rejected suggesting that there exists a cointegrating relationship among the variables. If the F-statistic falls below the lower critical bounds value, it implies that there is no cointegration relationship. However, when the F-statistic lies within the lower and upper bounds, then the test is inconclusive. In this context, the unit root tests should be conducted to ascertain the order of integration of the variables. If all the variables are found to be I(1), then the decision is taken on the basis of the upper critical value. On the other hand, if all the variables are I(0), then the decision is based on the lower critical bound value.

The ARDL model requires prior knowledge of the lag orders of variables, which is also sufficient to correct for autocorrelated residuals and the problem of endogenous regressors simultaneously (Pesaran and Shin (1999)). Thus, if there is evidence for the existence of cointegration (long-run relationship) between variables, the next step involves selecting the appropriate lag orders of the dependent variable and regressors involved to obtain what is known as the conditional (restricted) ARDL model. This is normally accomplished by applying OLS methods to estimate the general ARDL model of the form:

$$LBOT_t = \alpha + \sum_{i=1}^q \lambda_{1i} LBOT_{t-i} + \sum_{i=0}^{k_1} \lambda_{2i} LCOST_{t-i} + \sum_{i=0}^{k_2} \lambda_{3i} LCPS_{t-i} + \sum_{i=0}^{k_3} \lambda_{4i} LEXCH_{t-i} + \sum_{i=0}^{k_4} \lambda_{5i} LINF_{t-i} + \sum_{i=0}^{k_5} \lambda_{6i} LINV_{t-i} + \sum_{i=0}^{k_6} \lambda_{7i} LPER_{t-1} + U_t \quad (3)$$

Following Pesaran and Shin (1999), because of the small size of annual data a maximum lag length of two is used, so that (q = 2, k_i = 2) in Equation (3). By applying OLS method to the conditional ARDL long-run models in Equation (3) to obtain estimates of the long-run parameters $\lambda_1, \lambda_2, \lambda_3, \lambda_4, \lambda_5, \lambda_6$ and λ_7 . The estimated equation is also used to obtain an estimate of the error correction term (EC_{t-1}), which is obtained from Equation (3) as:

$$EC_{t-1} = LBOT_t - \alpha - \sum_{i=1}^q \lambda_{1i} LBOT_{t-i} - \sum_{i=0}^{k_1} \lambda_{2i} LCOST_{t-i} - \sum_{i=0}^{k_2} \lambda_{3i} LCPS_{t-i} - \sum_{i=0}^{k_3} \lambda_{4i} LEXCH_{t-i} - \sum_{i=0}^{k_4} \lambda_{5i} LINF_{t-i} - \sum_{i=0}^{k_5} \lambda_{6i} LINV_{t-i} - \sum_{i=0}^{k_6} \lambda_{7i} LPER_{t-1} \quad (4)$$

In this step, the resulting underlying ARDL equation (3) is also verified with all its statistical diagnostic properties to get unbiased and consistent/efficient estimates. The test for serial correlation (Breusch-Godfrey test), functional form (regression specification error test (RESET)), normality (Jarque-Bera normality test) and heteroscedasticity (White's general heteroscedasticity test,) are carried out to ensure that the models are well specified and congruent with data. The stability of the estimated coefficients over the sample period will also be examined by adopting the recursive residual test for structural stability. The Cumulative Sum of Recursive Residuals (CUSUM) and the Cumulative Sum of Square of Recursive Residuals (CUSUMQ) obtained from a recursive estimation of the models will be plotted against the time horizon of the sample. These are compared with the bound critical values at specified significance level. If the plot of the CUSUM and CUSUMSQ remains within the boundaries of the 5 percent critical bound the null hypothesis that all coefficients are stable cannot be rejected.



After the long-run parameters and the error correction term are estimated, the final step involves estimating the short-run dynamic parameters by applying OLS to the error correction representation of the conditional ARDL model in Equation (3). The ECM model is given by:

$$\Delta \text{LBOT}_t = \alpha + \sum_{i=1}^q \phi_i \Delta \text{LBOT}_{t-i} + \sum_{i=1}^{k_1} \epsilon_i \Delta \text{LCOST}_{t-i} + \sum_{i=1}^{k_2} \phi_i \Delta \text{LCPS}_{t-i} + \sum_{i=1}^{k_3} \xi_i \Delta \text{LEXCH}_{t-i} + \sum_{i=1}^{k_4} \gamma_i \Delta \text{LINF}_{t-i} + \sum_{i=1}^{k_5} \delta_i \Delta \text{LINV}_{t-i} + \sum_{i=1}^{k_6} \rho_i \text{LPER}_{t-i} + \mu \text{EC}_{t-1} + U_{1t} \quad (5)$$

where EC_{t-1} is the error correction term in (4) obtained from Equation (3). The parameters ϕ_i , ϵ_i , ϕ_i , ξ_i , γ_i , δ_i and ρ_i in Equation (5) are the short-run dynamic coefficients which measure the model's convergence to equilibrium, while the coefficient of the error correction term μ is the adjustment parameter, which gives the proportion of the deviations (errors) of the dependent variable from its long-run equilibrium value that has been adjusted (corrected). The coefficient must be negative and statistically significant. The negative sign of the coefficient means that the dependent variable adjusts back to its equilibrium value (or the dynamic model converges to equilibrium) following a disturbance; the magnitude of the coefficient measures the speed of adjustment.

5. Empirical Results:

5.1 Unit Root Test Results:

ARDL framework depends on time series characteristics of the data sets. So, initially we must investigate the order of integration. This is to ensure that the variables are not 1(2) stationary to avoid spurious results. As Ouattara (2004) argued, in the presence of 1(2) variables the computed F- statistics provided by Pesaran *et al.* (2001) are not valid. Because the bound test assumes that the variables are 1(0) or 1(1), therefore, the implementation of unit root tests in the ARDL procedure might still be necessary to ensure that none of the variables is 1(2) or beyond. The results of the ADF test are reported in Table 2. The results suggest that all the variables are integrated of order one i.e. stationary after first difference. This result gives support to the use of ARDL bounds approach to determine the long-run relationships among the variables.

Table 2. ADF Unit Root Tests for Stationarity of Variables.

variable	Calculated ADF statistic					Order of Integration I(d)
	Levels		1st differenced			
	With Intercept	With Intercept and Trend	With Intercept	With Intercept and Trend	Without Intercept and Trend	
LBOT	- 3.2461**	-3.1988*	-5.0400***	-4.8687***	-5.1115***	1(1)
LCOST	-2.1611	-1.3032	-3.8674***	-4.0648**	-3.9322***	1(1)
LCPS	-1.5603	-1.4987	-2.3762	-2.3686	-2.4205**	1(1)
LEXCH	-0.4374	-1.7060	-3.1639**	-3.1211	-2.3943**	1(1)
LINF	-1.6434	-1.7629	-4.1025***	-3.9231**	-4.1318***	1(1)
LINV	-2.4929	-3.1333	-6.8277***	-6.7317***	-6.8869***	1(1)
LPER	-1.5900	-1.5810	-4.0350***	-4.0809**	-4.0771***	1(1)

Source: Author's calculations. ***, **and *mean significant at 1%, 5% and 10%, respectively

5.2 Cointegration Analysis:

Since all used variables in the study become integrated by one differentiation (I(1)), we may use Pesaran *et al.* (2001) test for long term relation. As seen in table 3 below, the calculated F-statistic for all equations exceeds the corresponding upper critical bound value at the 5% significance level.



Therefore, we reject the null hypothesis of no cointegration and conclude that there is a long-run level relationship between the regressors and the dependent variable in each model.

Table 3. Cointegration Test: Dependent Variable Δ LBOT

F-Statistic	Critical value bounds of the F-statistics					
	1% Level		5% Level		10% Level	
	1(0)	1(1)	1(0)	1(1)	1(0)	1(1)
2.88	3.34	4.63	2.69	3.83	2.38	3.45

Source: Author’s calculations. Critical Values are from Pesaran et al. (2001), Table CI(v) Case V: Unrestricted intercept and unrestricted trend.

5.3 Estimation of the Long-Run Relationship:

Having found a long run relationship, we applied the ARDL method to estimate the long run coefficients for Equation (3). Table 4 reports the regression of the long-run relationship. The overall goodness of fit of the estimated equation, as shown in Table 4, is high; the F-statistic measuring the joint significance of all regressors is statistically significant.

It is obvious from Table 4 that in the long run exchange rate, inflation and real per capita GDP exert negative effects, while cost of finance, credit to the private sector and investment have positive effect on trade balance. As expected the coefficient of the cost of finance is positive and statistically significant. An increase in the cost of finance by 1% leads to an increase in trade balance over time by 0.37 percentage.

Table 4. Estimation of Long-Run Coefficients Using the Selected ARDL Model for LBOT.

Regressor	Coefficient	t-Ratio	Significance Level	R2	Calculated-F	Significance Level
Constant	0.987	0.904	0.372	0.71	6.36	0.000
LBOT ₋₁	0.368	2.107	0.043			
LCOST ₋₁	0.371	2.761	0.009			
LCPS ₋₁	0.272	2.606	0.014			
LEXCH ₋₁	-0.072	-2.873	0.007			
LINF ₋₁	-0.302	-3.286	0.002			
LINV ₋₁	0.216	2.705	0.010			
LPER ₋₁	-0.708	-2.116	0.042			

Source: Authors’ calculations.

The coefficient of the credit to the private sector is positive as expected and statistically significant at 1% level. 1% increase in the credit to the private sector leads to a respective trade balance increase of 0.27%.

The coefficient of the exchange rate has the wrong sign but statistically significant at 1% level. This is because devaluation/depreciation of domestic currency increases the cost of local as well as imported production inputs which leads to an increase in total imports and then deteriorates the balance of trade. The rigidities that characterize the Sudanese economy is one of the factors that leads to this inverse relationship between exchange rate and trade balance. Similar result was found by Mahran (1987) who argued that currency depreciation has quite often been criticized for its failure to provide the impetus for dramatic improvements in exports. Along the same line, Siddig (2011), argued that devaluation in Sudan would succeed in increasing domestic prices of tradable goods and encourage producers to



export. However, that affect domestic consumers negatively because the increase in prices is unaccompanied by similar increases in the households’ income. This could also lead the domestic production to deteriorate at certain time point, as the intermediate use cost will also increase especially the imported goods. Therefore, devaluation would encourage producers of some sectors to increase their output and exports, while hindering consumers to enjoy the previously cheaper imported and domestic commodities, as the domestic prices increase. However, the result contradicts with Edward (2010) in his study of the determinant of trade balance in Kenya who discovered that the exchange rate was a significant variable. The response of trade balance to exchange rate in Sudan according to this study is very low. Other things being equal, a 1% rise in exchange rate leads to a reduction in trade balance over time by 0.07 percentage points only.

The coefficient of inflation is highly significant and negative as expected. A 1% rise in inflation leads to a reduction in trade balance over time by 0.30 percentage points in the long run. In late 1980s and in 1990s Sudan witnessed very high inflation rates which distorted economic activity and reduced investment in productive enterprises, which in turn deteriorated trade balance and economic growth.

Also, long run equation states a significant positive effect of investment on trade balance in Sudan. In the model, this coefficient indicates that, other things being equal, a 1% rise in investment leads to an increase in trade balance over time by 0.22percentage points. This low response of trade balance to investment indicates that investment in Sudan does not have an important effect on trade balance. This weak relationship between investment and trade balance is attributed usually to the prevailing situations of political instability, prolonged civil wars, and other factors such as uncertainty over agricultural leases which resulted in declining investment, particularly in major agricultural projects.

The coefficient of real per capita GDP is highly significant and negative as expected. In the model, this coefficient indicates that, other things being equal, a 1% rise in real per capita GDP leads to a reduction in trade balance over time by 0.71 percentage points. This mean that an increase in per capita income increases demand for imported goods more than an increase in the demand for domestic goods.

Table 5 below reports the results of the diagnostic tests for the estimated long-run version of the ARDL model. The model passes all diagnostic tests of normality, serial correlation, functional form, and heteroscedasticity. For the model, Jarque-Bera, $\chi^2(2)$ test statistic has a very high p-value, suggesting normality of the residuals. Ramsey RESET F-statistic is significant, meaning that the model is correctly specified. White heteroscedasticity $\chi^2(2)$ test statistic with cross terms is also insignificant, suggesting that there is no heteroscedasticity in the models. Breusch-Godfrey $\chi^2(2)$ test statistic for serial correlation is insignificant for the model.

Table5. Diagnostic Tests of the Estimated Long-Run ARDL Models for LBOT (P-Values).

Normality (Jarque- Bera)	Ramsey RESET for Functional Form	Autocorrelation		White Heteroscedasticity
		DW	Breusch- Godfrey	
1.34 (0.543)	11.475 (0.050)	1.956	0.681 (0.432)	40.28 (0.254)

Source: Authors’ calculations.

It is important to investigate whether the above long run relationships are stable for the entire period of study. The stability of the model parameters is examined using the cumulative sum (CUSUM) and the cumulative sum of squares (CUSUMSQ) of the recursive residual test for structural stability proposed by Brown *et al.* (1975). CUSUM and CUSUMSQ are plotted against the break points. Parameter stability is indicated when the CUSUM and CUSUMSQ plots against time remain within the 5 percent significance level over the sample period, while parameters and hence the variance are unstable if these plots move outside the 5 percent critical lines. The plots of the CUSUM and CUSUMSQ in Figures 1 - 2 below are obtained from a recursive estimation of the model. These plots indicate stability in the coefficients of the model and instability in the coefficients of the second version of the model.

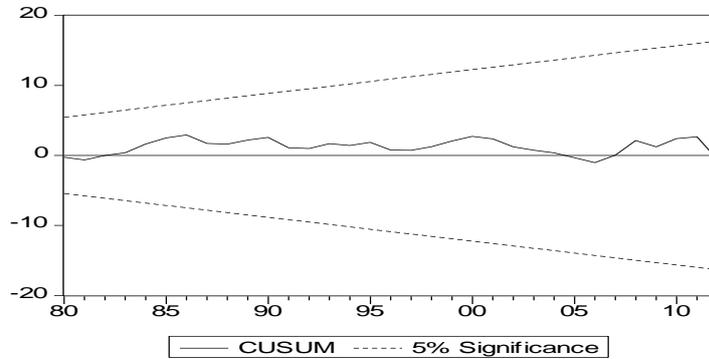


Figure 1. Cumulative sum of recursive residuals.

Source: obtained from estimated model in Table. 4

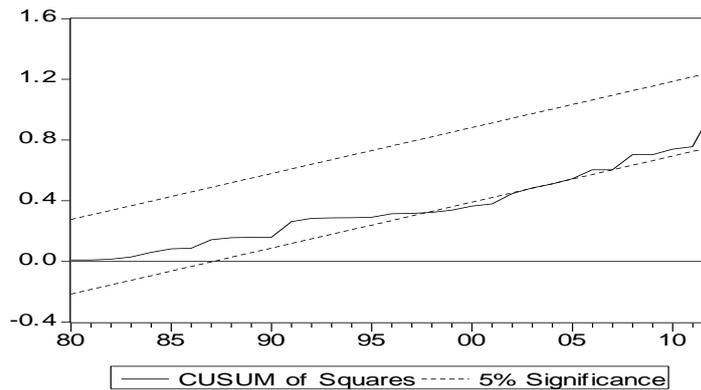


Figure 2. Cumulative sum of squares of recursive residuals.

Source: obtained from estimated model in Table. 4

5.4. Estimation of Short-Run Parameters:

Finally, we estimate the short-run dynamic coefficients by using OLS method to estimate the ECM equation associated with the ARDL long-run relationships. Table 9 below reports the results of the error correction representation of the estimated ARDL model. It is obvious from table 6 that the overall model is insignificant and the goodness of fit is very low. Although we could not find any short-run relationship between the explanatory variables and trade balance in Sudan, they are related in the long-run. In the short run most variables are statistically insignificant and have the correct signs except the coefficient of investment. Furthermore, only the coefficient (elasticity) of exchange rate is statistically significant as indicated by the t-ratio, and the magnitude of its coefficient (elasticity) in the short-run is greater than its long-run one. This mean that exchange rate affect trade balance in the short-run more than long-run.

The coefficient of the lagged residual (EC_{-1}) in the ECM model shows the speed of adjustment towards the equilibrium following a shock to the system. The coefficient has the correct sign and statistically



significant at 1% level. The coefficient of EC_{-1} is equal to (-0.159) and imply that deviations from the long-term trade balance is corrected by 15.9 percent between two successive time periods.

Table 6. Estimation of the Short-Run Dynamic Coefficients of the Error Correction Representations of the ARDL Models: Dependent Variable Δ LBOT

Regressor	Coefficient	t-Ratio	Signific Level	R ²	AIC	F-Statistic
Constant	0.069	1.190	0.334	0.236	0.433	1.534
Δ LBOT ₋₁	-0.0197	-0.095	0.991			
Δ LCOST ₋₁	0.193	0.905	0.380			
Δ LCPS ₋₁	0.167	0.587	0.641			
Δ LEXCH ₋₁	0.296	1.913	0.085			
Δ LINF ₋₁	-0.094	-0.828	0.451			
Δ LINV ₋₁	-0.024	-0.231	0.876			
Δ LPER ₋₁	-0.222	-0.420	0.785			
EC_{-1}	-0.160	-2.139	0.050			

Source: Authors' calculations.

6. Conclusion:

The purpose of this study is to investigate empirically the long-run relationship and short-run dynamic linkages between trade balance and its determinants in Sudan during the period 1970- 2014. The study employs the autoregressive distributed lag (ARDL) approach to co-integration and error correction models. We included six determinants of trade balance in our analysis which are exchange rate, cost of finance, credit to the private sector, real per capita GDP, inflation rate and domestic investment. In the long run exchange rate, inflation and real per capita GDP exert negative effects, while cost of finance, credit to the private sector and investment have positive effect on trade balance. All coefficients have the expected sign and statistically significant except the coefficient of the exchange rate which has the wrong sign. The rigidities that characterize the Sudanese economy is one of the factors that leads to this inverse relationship between exchange rate and trade balance. Similar result was found by Mahran (1987) and Siddig (2011). However, the result contradicts with Edward (2010) in his study of the determinant of trade balance in Kenya who discovered that the exchange rate was a significant variable. Also, we could not find any short-run relationship between the explanatory variables and trade balance in Sudan.

One of the most obvious implications of our results is that the government to reduce trade deficit should adopt policies that reduce inflation, increasing investment in productive sector and diversification of exports, including the revival of traditional exports such as cotton, and the development of non-traditional, non-oil exports which is also imperative for sustained growth and employment creation. Also, the economy needs more conducive investment climate to encourage more multinational companies to come and invest in the country especially those with that target to export from the country. As mentioned in previous studies of Mahran (1987) and Siddig (2011) and indicated on our results, devaluation of Sudanese currency is not the appropriate step to follow, other measure of currency stabilization is necessary to improve trade balance. Finally, central bank of Sudan should instruct banks to increase finance to the private sector and active policy reform programs have been undertaken to encourage the involvement of the private sector in Sudan's future growth.

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